PHOTOGRAPHIC INTERPRETATION REPORT



BEJUCAL
INTERNATIONAL
BROADCAST/
COMMUNICATIONS
(TRANSMITTING) FACILITY
HAVANA AREA
CUBA

NPIC/R-364/66 NOVEMBER 1966

Declass Review By NIMA/DOD

GROUP 1 EXCLUDED FROM AUTOMATIC DOWN GRADING AND DECLASSIFICATION

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WARNING

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BEJUCAL INTERNATIONAL BROADCAST/ COMMUNICATIONS (TRANSMITTING) FACILITY HAVANA AREA, CUBA

SUMMARY

An international broadcast/communications facility, covering approximately 600 acres, is nearing completion SE of Havana, Cuba (Figure 1). Antenna orientations indicate a radio relay link with Moskva, USSR, and a broadcast/communications capability with the Dominican Republic, Central and South America, and, if back azimuths apply (rear curtain), with the eastern two-thirds of the United States. All antennas appear to be of the transmitting types.

SIGNIFICANT DETAILS

This facility is 4.9 nm SE of Bejucal at 22-52-12N 082-20-00W, which is also SE of Havana. This facility was reported 1/ to be in the initial stages of construction in

Construction has now advanced to where testing procedures could commence at any time.

The facility contains 12 curtain antennas, 4 vee antennas, 6 rhombic antennas, 4 half-wave dipole antennas, and a 160-foot high mast of undetermined purpose.

The dual broadcast/communications designation of this facility is utilized in this report because there is no conclusive method of distinguishing by photography alone between

high gain directive arrays utilized for short wave broadcasting only and those arrays utilized for radio communication only.

A minimum textual discussion is utilized in this report because nearly all the data requested is either on the face of Figure 3 or in Tables 1 through 4.

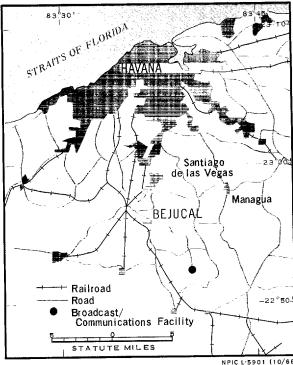


FIGURE 1. LOCATION OF THE BEJUCAL INTERNATIONAL BROADCAST/COMMUNICATIONS FACILITY, CUBA.

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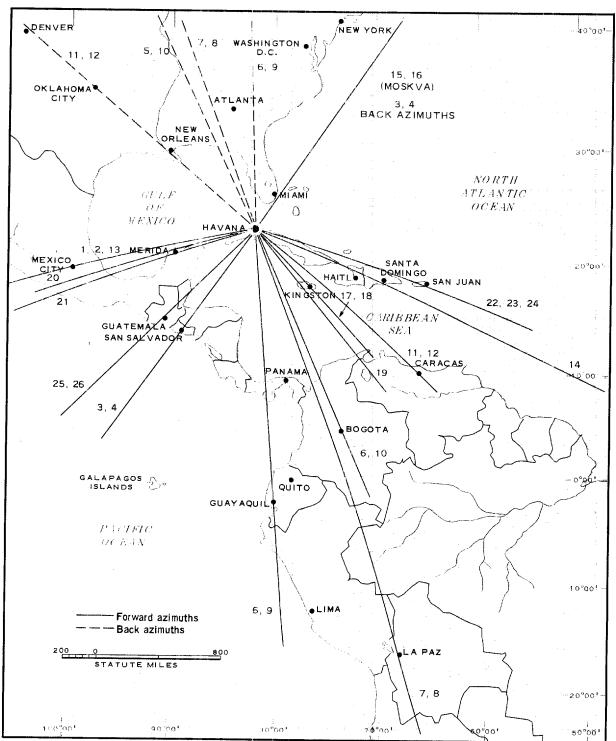


FIGURE 2. SELECTED ANTENNA AZIMUTH PROJECTIONS FROM THE BEJUCAL INTERNATIONAL BROADCAST/COMMUNI-

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Support structures include a buried and earth-mounded switch house, approximately 200 feet by 120 feet overall and a buried and earth-mounded control building approximately 320 by 200 feet overall, but the building itself was only 190 by 70 feet before mounding. Also included with the support structures are 7 barracks-type buildings, 4 maintenance-type structures, and several dispersed utility-type sheds.

The antenna azimuth projections shown in Figure 2 are presented with a rather high degree of confidence. The antenna frequencies, however, are presented with less confidence because of limitations inherent in a purely photographic interpretation approach to antenna analysis. The frequencies of the curtain antennas, as an example, are based on the assumption that they comply with standardized antenna engineering

practice including spacing the front and back curtain one-quarter wavelength apart. The rhombic antenna frequencies are purely empirical calculations based on the relationship of the tilt angle, wave angle, and leg length. If the rhombic antennas incorporate a frequency compromise, because they originate in a subtropical area (Havana) and extend into a high latitude area (Moskva), this compromise would not be apparent on photography.

A line of self-supporting pylon high tension towers from the general direction of Havana indicates that the principal source of electrical power is supplied from the outside. A fuel oil storage bunker is just east of the control bunker, presumably for on-site emergency diesel-electric generators.

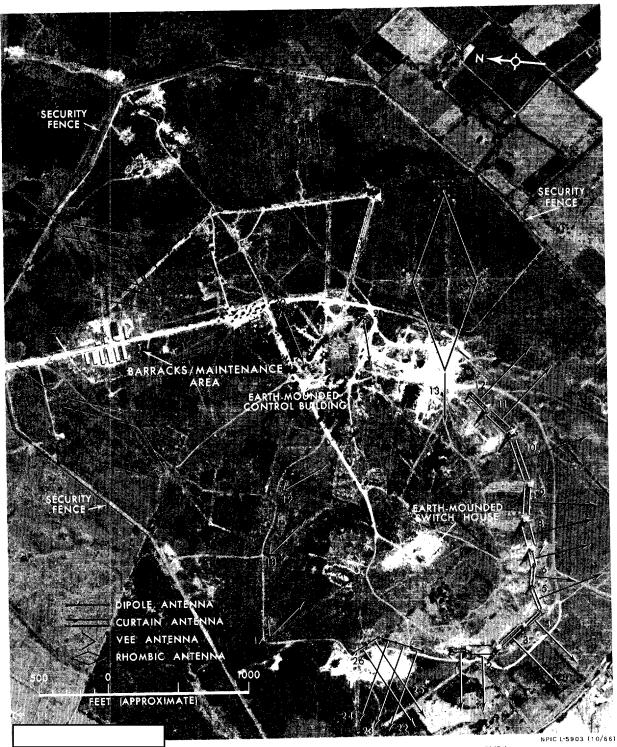


FIGURE 3. THE BEJUCAL INTERNATIONAL BROADCAST/COMMUNICATIONS FACILITY, CUBA.

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Table 1. Colinear, Cophased Curtain or "Serpentine" Antennas

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Azimuth Tower of Elements Antenna Tower Length in (degs)Probable Frequency Spacing Correspondent Number Height Wavelengths Fwd Back (ft) (ft) Across Down (me) (mtrs) 1 120 2 2 Mexico City, Mexico 15.1 19 115 1 2 2 7.5 2 250 230 1 Mexico City, Mexico 41 2 220 3 285 265 1 San Salvador, El Salvador 4.8 60 40 2 155 165 1 220 40 San Salvador, El Salvador 9.6 31 155 215 2 155 335 9.6 31 Bogota, Colombia 155 155 2 180 0 9.6 31 Ecuador 2 2 150 115 160 340 La Paz, Bolivia 15.1 19 250 2 2 230 160 340 La Paz, Bolivia 7.5 41 275 265 4 2 1 180 0 4.8 60 Ecuador 10 295 420 8 2 2 155 325 Bogota, Colombia 4.8 60 11 285 265 2 4 1 130 310 Caracas, Venezuela 4.8 60 12 150 165 1 130 310 Caracas, Venezuela 9.6 31

Note: Antenna numbers are keyed to Figures 2 and 3.

Table 2. Rhombic Antennas

Antenna Number	Major Axis (ft)	Minor Axis (ft)	End Pole Height (ft)	Length 1 side (ft)	Tilt Angle (degs)	Wave or Radiation (degs)	Azimuth (degs)	Skip Distance (sm)	Probable Correspondent	Antenna Height in Wavelengths	Leg Length in Wavelengths	Computed Frequency (mc)
13	1,350	490	130	710	70			1,200	Mexico City, Mexico	1.0	6	7.5
14	680	455	130	410	55		110/290	850	Haiti and Dominican Republic	0.6	2	4.8
14a	310		65	190	55		110/290	850	Haiti and Dominican Republic	0.6	2	9.6
15	950	470	130	530	65		30/210	1,000	Moskva	1	4	7.5
15a	560	210	100		70		30/210	1,200	Moskva	2	6	17.7
16	930		120	505			30/210	1,200	Moskva	2	5	9.5

Note: Antenna numbers are keyed to Figures 2 and 3.

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Table 3. Vee Antennas

Antenna Number	Antenna Pole Separation (ft)	Included Angle (degs)	Azimuth (degs)	Probable Correspondent	Length in Wavelength	Computed Frequency (mc) \(\lambda\)
17		90	130/310	Coastal Areas of Venezuela and Colombia	1	7.7
18		80	130/310	Coastal Areas of Venezuela and Colombia	1	15.4
19		90		Coastal Areas of Venezuela and Colombia	1	19.2
20		90		Area of the Yucatan Peninsula	1	15.4
21		90		Area of the Yucatan Peninsula	1	15.4

Note: Antenna numbers are keyed to Figures 2 and 3.

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Table 4. Half-wave Dipole Antennas

Antenna Number	Pole Separation (ft)	Less 1/3 for Strain Insulator (ft)	Net Antenna Length (ft) 1/2 λ	Azimuth (degs)	Probable Correspondent	Calculated Frequency (mc) λ
22					San Juan, Puerto Rico	9.5
23					San Juan, Puerto Rico	5.9
24					San Juan, Puerto Rico	4.8
25					Belize, British Honduras	7.7
26					Yucatan, Mexico	5.9
27	0 0 0		igh of undetermined bazar Receiving Fa		bly a vertical radiator, or poss	ibly a

Note: Antenna numbers are keyed to Figures 2 and 3.

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1							
5X1D	REFERENCES						
4							
:	MAPS OR CHARTS						
	AMS Series E723, Sheet 3784IV, 3d cd, no date, scale 1:50,000 (UNCLASSIFIED) US Air Force, Gnomic Tracking Chart, GT 18, Jul 45, scale 1:10,500,000 (UNCLASSIFIED)						
	DOCUMENT						
	1. NPIC. R-1519/63, Cuban International Communication/Broadcast Stations, Oct 63 (SECRET)						
	REQUIREMENT						
:	CIA. C-CI6-83,501						
	NPIC PROJECT						
	11563/66						

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